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# **Participatory Design Project Management : Addressing Production Effectiveness for WMSD Prevention The Case of the Carving Line of a Duck Slaughterhouse**

Fabien COUTAREL, Bernard DUGUE, François DANIELLOU  
*Laboratoire d'Ergonomie des Systèmes Complexes, Université Bordeaux 2  
146 rue Léo Saignat, 33076 Bordeaux Cedex, France*

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## **1. Introduction**

Research has highlighted the multifactorial origin of work-related musculoskeletal disorders (WMSD), and the weight of psychosocial factors. Less research work has been devoted to the design of ergonomic interventions aiming at WMSD prevention. Yet, analysing and assessing such interventions may yield two types of results :

- ergonomic interventions put to the test the models of the pathology that are produced by researchers, and the successes and failures of the former bring information on the operational value of the latter ;
- formalising the effective components of prevention interventions may help to foster capitalisation and spreading of methods among the practitioners.

Based on an intervention carried out in a duck slaughterhouse, the research aimed at testing following hypotheses regarding the design of a WMSD :

- importance of setting up a real project management, combining health issues and economic stakes, and involving the top management, the middle management and the workers ;
- worker participation is a way to design better technical solutions ; but it is also an opportunity for them to develop a new relation to their own work, that is a necessary component of prevention.

## **2. Methods**

The intervention took place in the carving unit of a duck slaughterhouse. The project aimed at reducing WMSD and increasing the line productivity and product quality. It involved three ergonomists during 2 years.

The intervention methodology main features were :

- a strong relation of the ergonomists with the plant top management and the external machinery designers, as well as with the occupational physician and the preventionists ;
- setting up project structures (steering group, management work group, operator work group) that defined and organised everyone's role ;
- work activity analysis in the former unit, as well as in two other slaughterhouses
- a focus on the variability of the production, and the need for more "room for manoeuvre" along the line, to make it possible for the operators to cope with the variations of production cycles (incidents) ;
- a combined approach of organisational and physical design ;

- simulations on drawings and models of all components of the new unit.

The research methodology was based on standardized questionnaires used before and after the project, analysis of all “turning-points” of the intervention (analysis of ergonomists’ influence on decision making at all design steps), follow-up of production data, and interviews with managers.

### **3. Results**

The main results of the intervention were :

- a reduction of the work rate (1050 ducks per hour to 600), with 2 lines instead of one, and 25 workers instead of 17 ; this was made possible by the increase in quality (60 more grams of meat retrieved from each duck) ;
- the recruitment of female workers, while on the former line only men could work ;
- a change in the production process : the duck necks are cut off in the slaughtering unit and no longer on the carving line ;
- design of the workstations with reference to ergonomic standards, and introduction of “empty” stations between workstations, to make training or assistance possible ;
- setting up a “line facilitator” to help the operators, train the new ones, co-ordinate the rotation on the line, and promote continuous improvement ;
- reduction of recognised WMSD, and related complaints (after the training period on the new line) ;
- changes in management style and improvement of social relations

### **4. Discussion and conclusions**

Assessment of the intervention one year after start-up of the new unit yields very positive results, both from the health and economic standpoints. Yet we know that regarding WMSD such results are never gained in a definitive manner, and that sustained feedback and improvements are necessary.

Following aspects have to be stressed :

- The formal assessment of the intervention set up as a component of the research approach has played a positive role in the intervention, enabling discussion and processing of problems that remained after the project. The formal assessment also fostered a better capitalisation of the methods. This could lead to encourage the practitioners to set up assessment tools as a part of their projects.
- In spite of all the design precautions taken, complaints about pains in the upper limb appeared during the six first months of presence of new workers, but disappeared after this period in % of the cases. Our interpretation is that the participatory style, the assistance and training provided by the facilitator and the integration in the work group have made it possible to overcome the first difficulties, that improved design had not suppressed.
- The results have been gained through a continuous taking in account of economic and quality stakes. This requires building up compromise solutions at all steps of the design process. While this is part of the ergonomists’ culture, it may raise difficulties in their co-operation with other actors, such as work physician, safety or hygiene inspectors, whose role may not predispose them to the same approach, while the design compromises have to be ratified by the authorities they are representing. The ergonomists’ relation with official labour and health authorities appears a key issue in WMSD prevention.

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**Corresponding Author**

* Academic Title	<b>Attaché Temporaire d'Enseignement et de Recherche</b>			
* Last Name	<b>Coutarel</b>			
* First Name	<b>Fabien</b>			
* Organization	<b>Laboratoire d'Ergonomie des Systèmes Complexes, Université Bordeaux 2</b>			
* Mailing Address	<a href="mailto:Fabien.coutarel@etud.u-bordeaux2.fr">Fabien.coutarel@etud.u-bordeaux2.fr</a>			
* Country	<b>France</b>			
* Postal Code	<b>33076 Bordeaux cedex</b>			
* Phone	Country Code	<b>+33</b>	Number	<b>557571042</b>
Fax	Country Code	<b>+33</b>	Number	<b>556900873</b>
* User ID <sup>1</sup>	<b>fabien.coutarel@etud.u-bordeaux2.fr</b>			

**Authors**

* Main author: Name	<b>Coutarel Fabien</b>
* Presenting author: Name (if different from main author)	
Coauthor 1: Name	<b>Dugué Bernard</b>
Coauthor 2: Name	<b>Daniellou François</b>
Coauthor 3: Name	
Coauthor 4: Name	
Coauthor 5: Name	

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